Installation Instructions

ControlLogix™ AC (10-265V) DC (5-150V) Isolated Contact Module

Catalog Number 1756-OW16I

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Obtain a User Manual

This product also has a user manual (pub. no. 1756-UM058). To view it, visit www.ab.com/manuals or www.theautomationbookstore.com.

To purchase a manual, you can:

- contact your distributor or Rockwell Automation representative
- visit www.theautomationbookstore.com and place an order
- call 800.963.9548 (USA/Canada) or 001.320.725.1574 (outside USA/Canada)

Publication 1756-IN011B-EN-P - February 2003

Important User Information

Because of the variety of uses for the products described in this publication, those responsible for the application and use of these products must satisfy themselves that all necessary steps have been taken to assure that each application and use meets all performance and safety requirements, including any applicable laws, regulations, codes and standards. In no event will Rockwell Automation be responsible or liable for indirect or consequential damage resulting from the use or application of these products.

Any illustrations, charts, sample programs, and layout examples shown in this publication are intended solely for purposes of example. Since there are many variables and requirements associated with any particular installation, Rockwell Automation does not assume responsibility or liability (to include intellectual property liability) for actual use based upon the examples shown in this publication.

Allen-Bradley publication SGI-1.1, *Safety Guidelines for the Application, Installation and Maintenance of Solid-State Control* (available from your local Rockwell Automation office), describes some important differences between solid-state equipment and electromechanical devices that should be taken into consideration when applying products such as those described in this publication.

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Throughout this publication, notes may be used to make you aware of safety considerations. The following annotations and their accompanying statements help you to identify a potential hazard, avoid a potential hazard, and recognize the consequences of a potential hazard:

WARNING	Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.
ATTENTION	Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss.
IMPORTANT	Identifies information that is critical for successful application and understanding of the product.

ControlLogix is a trademark of Rockwell Automation, Inc.

Environment and Enclosure

This equipment is intended for use in a Pollution Degree 2 industrial environment, in overvoltage Category II applications (as defined in IEC publication 60664-1), at altitudes up to 2000 meters without derating.

This equipment is considered Group 1, Class A industrial equipment according to IEC/CISPR Publication 11. Without appropriate precautions, there may be potential difficulties ensuring electromagnetic compatibility in other environments due to conducted as well as radiated disturbance.

This equipment is supplied as "open type" equipment. It must be mounted within an enclosure that is suitably designed for those specific environmental conditions that will be present and appropriately designed to prevent personal injury resulting from accessibility to live parts. The interior of the enclosure must be accessible only by the use of a tool. Subsequent sections of this publication may contain additional information regarding specific enclosure type ratings that are required to comply with certain product safety certifications.

See NEMA Standards publication 250 and IEC publication 60529, as applicable, for explanations of the degrees of protection provided by different types of enclosure. Also, see the appropriate sections in this publication, as well as the Allen-Bradley publication 1770-4.1 ("Industrial Automation Wiring and Grounding Guidelines"), for additional installation requirements pertaining to this equipment.

Prevent Electrostatic Discharge

This equipment is sensitive to electrostatic discharge, which can cause internal damage and affect normal operation. Follow these guidelines when you handle this equipment:

- Touch a grounded object to discharge potential static.
- Wear an approved grounding wriststrap.
- Do not touch connectors or pins on component boards.
- Do not touch circuit components inside the equipment.
- If available, use a static-safe workstation.

When not in use, store the equipment in appropriate static-safe packaging.

Removal and Insertion Under Power

WARNING

When you insert or remove the module while backplane power is on, an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding.

Repeated electrical arcing causes excessive wear to contacts on both the module and its mating connector. Worn contacts may create electrical resistance that can affect module operation.

European Zone 2 Use

If you install the module in a European Zone 2 location, consider:

European Zone 2 Certification

This equipment is intended for use in potentially explosive atmospheres as defined by European Union Directive 94/9/EC.

The LCIE (Laboratoire Central des Industries Electriques) certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of Category 3 equipment intended for use in potentially explosive atmospheres, given in Annex II to this Directive. The examination and test results are recorded in confidential report No. 28 682 010.

Compliance with the Essential Health and Safety Requirements has been assured by compliance with EN 50021 (1999).

IMPORTANT When using this product, also consider the following:

- This equipment is not resistant to sunlight or other sources of UV radiation.
- The secondary of a current transformer shall not be open-circuited when applied in Class I, Zone 2 environments.
- Equipment of lesser Enclosure Type Rating must be installed in an enclosure providing at least IP54 protection when applied in Class I, Zone 2 environments.
- This equipment shall be used within its specified ratings defined by Allen-Bradley.
- Provision shall be made to prevent the rated voltage from being exceeded by transient disturbances of more than 40% when applied in Class I, Zone 2 environments.

Identify the Module Components

You received the following components with your order:

- 1756-OW16I module
- Removable Terminal Block (RTB) door label

If you did not receive these components, contact your local distributor Rockwell Automation sales office.

This module mounts in a 1756 chassis and uses a separately-ordered RTB or a Bulletin 1492 Interface Module (IFM)[1] to connect all field-side wiring. This module uses one of the following RTBs:

- 1756-TBCH 36 position Cage clamp RTB
- 1756-TBS6H 36 position Spring clamp RTB

Use an extended-depth cover (1756-TBE) for applications with heavy gauge wiring or requiring additional routing space. When using an IFM, consult the documentation that came with it to connect wiring.

IMPORTANT Before you install your module, you should:

- install and ground a 1756 chassis and power supply.
- order and receive an RTB or IFM, and its components, for your application.

Note the Power Requirements

This module receives power from the 1756 chasis power supply and requires 2 sources of power from the backplane:

- 150mA at 5.1V dc
- 150mA at 24V dc

Add this current/power value (4.4W) to the requirements of all other modules in the chassis to prevent overloading the power supply. Field output supply power should be limited to 10KVA available short circuit power.

[1] The Bulletin 1492 IFM may not be used in any application that requires agency certification of the ControlLogix system. Use of the IFM violates the UL, CSA and FM certifications of this product.

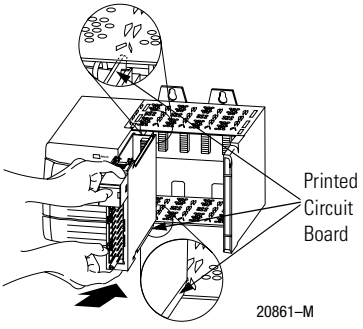
Install the Module

You can install or remove the module while chassis power is applied.

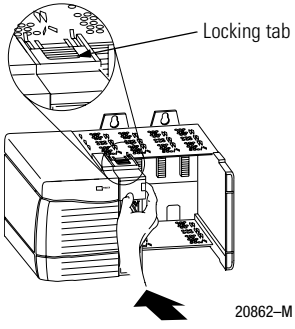
WARNING

When you insert or remove the module while backplane power is on, an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding.

1. Align the circuit board with the top and bottom chassis guides.



2. Slide the module into the chassis until the module locking tabs click.

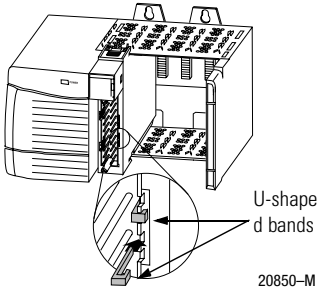


Key the Module and Removable Terminal Block/Interface Module

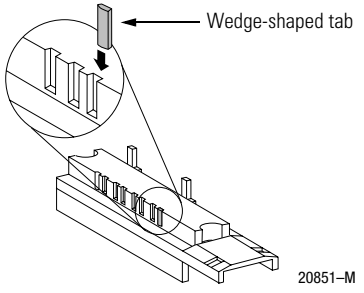
Use the wedge-shaped keying tabs and U-shaped keying bands to prevent connecting the wrong wires to your module.

Key positions on the module that correspond to unkeyed positions on the RTB. For example, if you key the first position on the module, leave the first position on the RTB unkeyed.

1. To key the module, insert the U-shaped band, as shown.



2. Push the band until it snaps in place.
3. To key the RTB or IFM, insert the wedge-shaped tab with rounded edge first, as shown.



4. Push the tab until it stops.

Reposition the tabs to rekey future module applications.

Wire the Removable Terminal Block

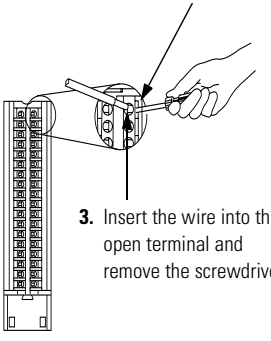
Wire the RTB with a 1/8 inch (3.2mm) maximum flat-bladed screwdriver before installing it onto the module.

WARNING

When you connect or disconnect the Removable Terminal Block (RTB) with field side power applied, an electrical arc can occur. This could cause an explosion in hazardous location installations. Make sure that power is removed or the area is nonhazardous before proceeding.

Spring Clamp RTB

1. Strip 7/16 inch (11mm) maximum length of wire.
2. Insert the screwdriver into the inner hole of the RTB.



3. Insert the wire into the open terminal and remove the screwdriver.

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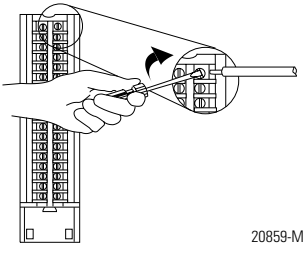
Cage Clamp RTB

1. Strip 3/8 inch (9.5mm) maximum length of wire.
2. Insert the wire into the open terminal.
3. Turn the screw clockwise to close the terminal on the wire.



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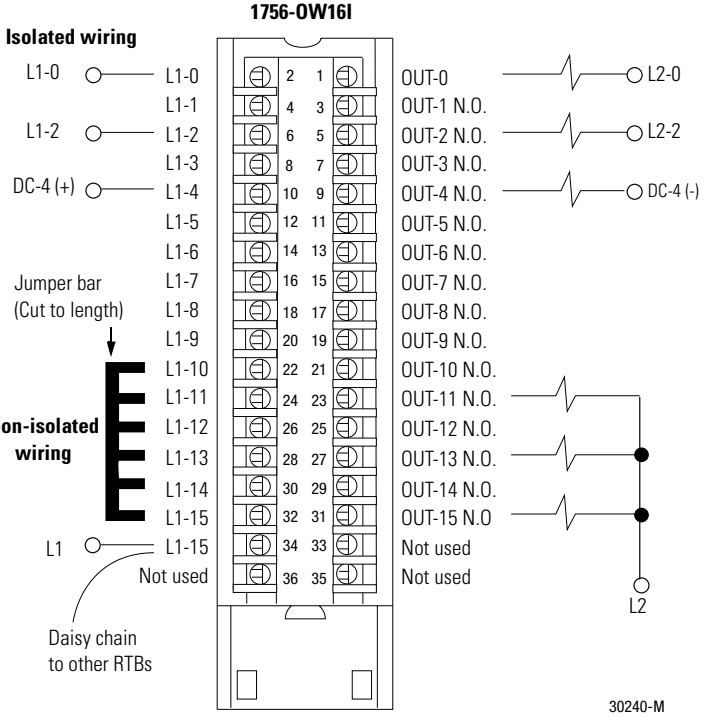
Wire the Module

You can only connect wiring to your module through an RTB or IFM. The example below shows how to wire the module.



NOTES: **1.** All terminals with the same name are connected together on the module. For example, L1 can be connected to either terminal marked L1-15.

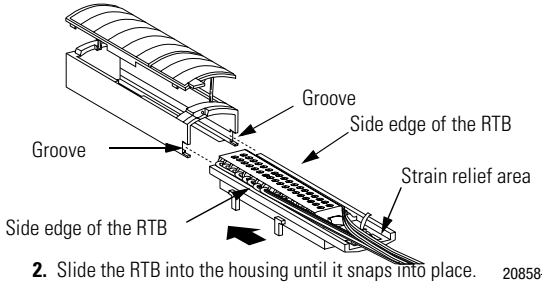
2. When daisy chaining the second L1-15 terminal to other RTBs, always connect the daisy chain to the terminal directly connected to the supply wire, as shown in the example above. Do not connect more than 2 wires to any single terminal.

3. If separate power sources are used, do not exceed the specified isolation voltage.

After completing field-side wiring, secure the wires in the strain relief area with a cable-tie.

Assemble the Removable Terminal Block and the Housing

1. Align the grooves at the bottom of the housing with the side edges of the RTB.



2. Slide the RTB into the housing until it snaps into place.

Install the Removable Terminal Block onto the Module

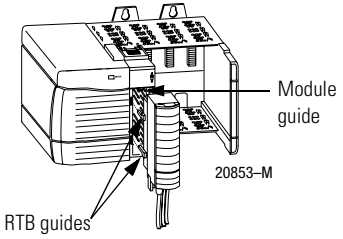
WARNING

When you connect or disconnect the Removable Terminal Block (RTB) with field side power applied, an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding.

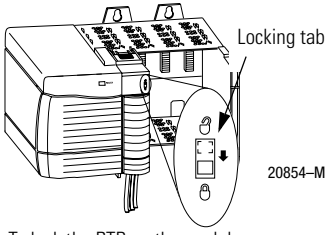
Before installing the RTB, make certain:

- field-side wiring of the RTB has been completed.
- the RTB housing is snapped in place on the RTB.
- the RTB housing is closed.
- the locking tab at the top of the module is unlocked.

1. Align the side and top, bottom guides.



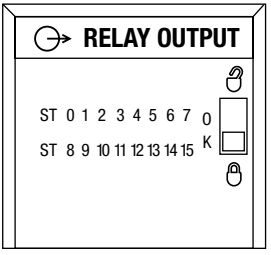
2. Press quickly and evenly to seat the RTB until the latches snap into place.



3. To lock the RTB on the module, slide the locking tab down.

Check the Indicators

The indicators show individual I/O status (yellow) for each point and a bi-colored LED for module "OK" (red/green).



During power up, an indicator test is done and the following occurs:

- "OK" indicator turns red for 1 second and then turns to flashing green if it has passed the self-test.
- I/O status indicators turn ON for a maximum of 2 seconds and then turn OFF.

Indicator:	Displaying:	Means:	Take this action:
OK	Steady green light	The outputs are actively being controlled by a system processor.	None
OK	Flashing green light	The module has passed internal diagnostics but is not actively controlled.	Configure the module.
OK	Flashing red light	Previously established communication has timed out.	Check controller and chassis communication.
OK	Steady red light	An unrecoverable error has occurred on the module.	Replace the module.
I/O State	Yellow	The output is active.	None

This completes installation of the module. Use the following information to remove the module, if necessary.

Remove the Removable Terminal Block from the Module

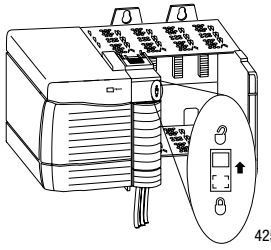
If you need to remove the module, you must remove the RTB first.

WARNING

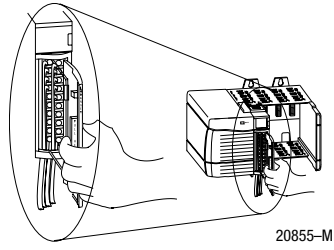
When you insert or remove the module while backplane power is on, an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding.

Before removing the module, you must remove the RTB.

1. Unlock the locking tab at the top of the module.

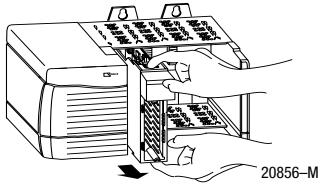


2. Open the RTB door and pull the RTB off the module.

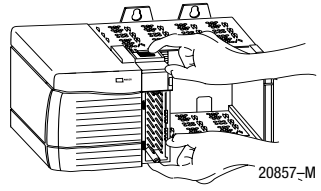


Remove the Module

1. Push in top and bottom locking tabs.



2. Pull module out of the chassis.



1756-OW16I Specifications

Number of Outputs	16 N.O. (Contacts individually isolated)
Module Location	1756 ControlLogix Chassis
Backplane Current	150mA @ 5.1V dc & 150mA @ 24V dc (4.4W Total backplane power)
Maximum Power Dissipation (Module)	4.5W @ 60ºC
Thermal Dissipation	15.35 BTU/hr
Output Voltage Range	10-265V 47-63Hz/5-150V dc
Output Voltage Range (load dependent)	5-30V dc @ 2.0A resistive 48V dc @ 0.5A resistive 125V dc @ 0.25A resistive 125V ac @ 2.0A resistive 240V ac @ 2.0A resistive
UL Ratings	C300, R150 Pilot Duty
Minimum Load Current	10mA per point
Initial Contact Resistance	30mΩ
Switching Frequency	1 operation/3s (0.3Hz at rated load) maximum
Bounce Time	1.2ms (mean)
Expected Contact Life	300k cycles resistive/100k cycles inductive
Maximum Off-State Leakage Current	1.5mA per point
Output Delay Time OFF to ON ON to OFF	 10ms maximum 10ms maximum
Scheduled Outputs	Synchronization within 16.7 seconds maximum, reference to the Coordinated System Time
Output Current Rating (at rated power)	Resistive / Inductive 2A @ 5-30V dc / 2.0A steady state @ 5-30V dc 0.5A @ 48V dc / 0.5A steady state @ 48V dc 0.25A @ 125V dc / 0.25A steady state @ 125V dc 2A @ 125V ac / 2.0A steady state, 15A make @ 125V ac 2A @ 240V ac / 2.0A steady state, 15A make @ 240V ac

Power Rating (steady state)	250W maximum for 125V ac resistive output 480W maximum for 240V ac resistive output 60W maximum for 30V dc resistive output 24W maximum for 48V dc resistive output 31W maximum for 125V dc resistive output 250VA maximum for 125V ac inductive output 480VA maximum for 240V ac inductive output 60VA maximum for 30V dc inductive output 24VA maximum for 48V dc inductive output 31VA maximum for 125V dc inductive output
Configurable Fault States/Point	Hold Last State, ON or OFF (OFF is the default)
Configurable States in Program Mode per Point	Hold Last State, ON or OFF (OFF is the default)
Fusing	Not protected - Fused IFM can be used to protect outputs (See publication 1492-2.12). The Bulletin 1492 IFM may not be used in any application that requires agency certification of the ControlLogix system. Use of the IFM violates the UL, CSA and FM certifications of this product.
Isolation Voltage User to system	 250V maximum continuous 100% tested at 2546V dc for 1s
RTB Screw Torque (Cage clamp)	4.4 inch-pounds (0.4Nm) maximum
Module Keying (Backplane)	Software configurable
RTB Keying	User defined mechanical keying
Field Wiring Arm and Housing	36 Position RTB (1756-TBCH or TBS6H)[1]
Environmental Conditions	
Operating Temperature	IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock): 0 to 60°C (32 to 140°F)
Storage Temperature	IEC 60068-2-1 (Test Ab, Un-packaged Non-operating Cold), IEC 60068-2-2 (Test Bb, Un-packaged Non-operating Dry Heat), IEC 60068-2-14 (Test Na, Un-packaged Non-operating Thermal Shock): –40 to 85°C (–40 to 185°F)

Relative Humidity	IEC 60068-2-30 (Test Db, Un-packaged Non-operating Damp Heat): 5 to 95% non-condensing
Vibration	IEC60068-2-6 (Test Fc, Operating): 2g @ 10-500Hz
Shock	IEC60068-2-27 (Test Ea, Unpackaged shock): Operating 30g Non-operating 50g
Emissions	CISPR 11: Group 1, Class A
ESD Immunity	IEC 61000-4-2: 6kV contact discharges 8kV air discharges
Radiated RF Immunity	IEC 61000-4-3: 10V/m with 1kHz sine-wave 80%AM from 30MHz to 1000MHz 10V/m with 200Hz 50% Pulse 100%AM at 900Mhz
EFT/B Immunity	IEC 61000-4-4: ±4kV at 2.5kHz on power ports ±4kV at 2.5kHz on signal ports
Surge Transient Immunity	IEC 61000-4-5: ±1kV line-line(DM) and ±2kV line-earth(CM) on power ports ±1kV line-line(DM) and ±2kV line-earth(CM) on signal ports
Conducted RF Immunity	IEC 61000-4-6: 10Vrms with 1kHz sine-wave 80%AM from 150kHz to 80MHz
Enclosure Type Rating	None (open-style)

Conductors	Wire Size	#22 to #14 AWG (0.324 to 2.08 sq. mm) stranded[1] 3/64 inch (1.2mm) insulation maximum
	Category	1[2], [3]
Screwdriver Blade Width for RTB		1/8 inch (3.2mm) maximum
Certifications (when product is marked)		UL UL Listed Industrial Control Equipment CSA CSA Certified Process Control Equipment CSA CSA Certified Process Control Equipment for Class I, Division 2 Group A,B,C,D Hazardous Locations FM FM Approved Equipment for use in Class I Division 2 Group A,B,C,D Hazardous Locations CE[4] European Union 89/336/EEC EMC Directive, compliant with: EN 50082-2; Industrial Immunity EN 61326; Meas./Control/Lab., Industrial Requirements EN 61000-6-2; Industrial Immunity EN 61000-6-4; Industrial Emissions European Union 73/23/EEC LVD Directive, compliant with: EN 61131-2; Programmable Controllers C-Tick[4] Australian Radiocommunications Act, compliant with: AS/NZS 2064; Industrial Emissions EEx[4] European Union 94/9/EEC ATEX Directive, compliant with: EN 50021; Potentially Explosive Atmospheres, Protection “n” when conformal coated

(1) Maximum wire size requires extended housing - 1756-TBE.

(2) Use this conductor category information for planning conductor routing as described in the system level installation manual.

(3) Refer to publication 1770-4.1 *Industrial Automation Wiring and Grounding Guidelines*.

(4) See the Product Certification link at www.ab.com for Declarations of Conformity, Certificates, and other certification details.

The following information applies when operating this equipment in hazardous locations:	**Informations sur l'utilisation de cet équipement en environnements dangereux :**
Products marked "CL I, DIV 2, GP A, B, C, D" are suitable for use in Class I Division 2 Groups A, B, C, D, Hazardous Locations and nonhazardous locations only. Each product is supplied with markings on the rating nameplate indicating the hazardous location temperature code. When combining products within a system, the most adverse temperature code (lowest "T" number) may be used to help determine the overall temperature code of the system. Combinations of equipment in your system are subject to investigation by the local Authority Having Jurisdiction at the time of installation.	Les produits marqués "CL I, DIV 2, GP A, B, C, D" ne conviennent qu'à une utilisation en environnements de Classe I Division 2 Groupes A, B, C, D dangereux et non dangereux. Chaque produit est livré avec des marquages sur sa plaque d'identification qui indiquent le code de température pour les environnements dangereux. Lorsque plusieurs produits sont combinés dans un système, le code de température le plus défavorable (code de température le plus faible) peut être utilisé pour déterminer le code de température global du système. Les combinaisons d'équipements dans le système sont sujettes à inspection par les autorités locales qualifiées au moment de l'installation.
WARNING **EXPLOSION HAZARD** • Do not disconnect equipment unless power has been removed or the area is known to be nonhazardous. • Do not disconnect connections to this equipment unless power has been removed or the area is known to be nonhazardous. Secure any external connections that mate to this equipment by using screws, sliding latches, threaded connectors, or other means provided with this product. • Substitution of components may impair suitability for Class I, Division 2. • If this product contains batteries, they must only be changed in an area known to be nonhazardous.	**AVERTISSEMENT** **RISQUE D'EXPLOSION** • Couper le courant ou s'assurer que l'environnement est classé non dangereux avant de débrancher l'équipement. • Couper le courant ou s'assurer que l'environnement est classé non dangereux avant de débrancher les connecteurs. Fixer tous les connecteurs externes reliés à cet équipement à l'aide de vis, loquets coulissants, connecteurs filetés ou autres moyens fournis avec ce produit. • La substitution de composants peut rendre cet équipement inadapté à une utilisation en environnement de Classe I, Division 2. • S'assurer que l'environnement est classé non dangereux avant de changer les piles.

Notes:

Rockwell Automation Support

Rockwell Automation provides technical information on the web to assist you in using its products. At http://support.rockwellautomation.com, you can find technical manuals, a knowledge base of FAQs, technical and application notes, sample code and links to software service packs, and a MySupport feature that you can customize to make the best use of these tools.

For an additional level of technical phone support for installation, configuration, and troubleshooting, we offer TechConnect Support programs. For more information, contact your local distributor or Rockwell Automation representative, or visit http://support.rockwellautomation.com.

Installation Assistance

If you experience a problem with a hardware module within the first 24 hours of installation, please review the information that's contained in this manual. You can also contact a special Customer Support number for initial help in getting your module up and running.

United States	1.440.646.3223 Monday – Friday, 8am – 5pm EST
Outside United States	Please contact your local Rockwell Automation representative for any technical support issues.

New Product Satisfaction Return

Rockwell tests all of its products to ensure that they are fully operational when shipped from the manufacturing facility. However, if your product is not functioning, it may need to be returned.

United States	Contact your distributor. You must provide a Customer Support case number (see phone number above to obtain one) to your distributor in order to complete the return process.
Outside United States	Please contact your local Rockwell Automation representative for return procedure.

www.rockwellautomation.com

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